Space Weather Forecast

Issued on Wednesday, 01 March 2023 at 01:11 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Recent coronal mass ejection (CME) and fast wind influence gradually easing on March 1st. Chance of Moderate flares, with slight chance of Strong flares.

Analysis of Space Weather Activity over past 24 hours

Solar Activity:
Moderate activity in the past 24 hours, with a single Moderate class flare observed, from a large and magnetically complex sunspot region, located in the northwest quadrant. There are currently six sunspot regions on the Earth-facing disc, with most sunspots small, simple and inactive. However, a further region on the northeast limb may appear more complex as it rotates further into view. The moderate-class flare did produce a coronal mass ejection (CME) which is currently undergoing analysis for any Earth-directed component. Currently, no Earth-directed CMEs have been observed on visible imagery.

Solar Wind / Geomagnetic Activity: Solar winds have been strong during the past 24 hours, due to the waning effects of the recent two CME arrivals, with a peak of 781km/s at 28/0556 UTC. Solar winds are now steadily declining back towards elevated levels, currently ranging between 600-700km/s, which is probably due to a fast wind from a coronal hole, which was initially masked by the recent CME effects. Total magnetic field strength has been moderate to weak. The north-south component has varied weakly throughout. Geomagnetic activity started the period at G2/Moderate Storm levels falling to G1/Minor Storm for one interval, but has been mostly Quiet to Unsettled since.

Energetic Particles / Solar Radiation: The count rate of energetic particles has been has fallen towards background levels through the last 24 hours.

Four-Day Space Weather Forecast Summary

Solar Activity: Low to Moderate activity is forecast through the period, mainly due to the large and magnetically complex sunspot region in the northwest quadrant. An emerging sunspot region in the far northeast may also start to contribute to the flare risk.

Solar Wind / Geomagnetic Activity: Recent CME activity is declining, with speeds decreasing towards elevated levels. No further CMEs are forecast to affect the Earth. Solar winds are expected to slowly decline towards slightly elevated or background levels by the end of 01 Mar as the high speed stream effects decline. Geomagnetic activity is forecast to start mainly Quiet to Unsettled, but with an initial small chance of Active intervals. Mostly Quiet for the remainder of the period, but possibly becoming Quiet to Unsettled, with a slight chance of Active or G1/minor storm interval on day 4 (04 March) due to the possible arrival of a fast wind from a coronal hole.

Energetic Particles / Solar Radiation: The count rate of energetic protons is expected to fall to background with only a slight chance of further enhancements. These are most likely to be due

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to any flares from the large sunspot in the northwest.

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	Yes	10	1	1	20
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	65	60	50	50
Very Active	R3 to R5 X	No	20	20	15	10

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	10	10	10	10
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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